

N° 9396



A.D. 1914

*Date of Application, 16th Apr., 1914*

*Complete Specification Left, 16th Oct., 1914—Accepted, 15th Apr., 1915*

**PROVISIONAL SPECIFICATION.**

**Improvements relating to the Purification of Water, more particularly Feed-water for Steam Generators, Hot-water Systems and the like.**

I, CHARLES HAYTHORPE, of 7, Bowling Green Street, Kennington, London, S.E., Engineer, do hereby declare the nature of this invention to be as follows:—

This invention relates to the purification of water, more particularly feed-water for steam generators, hot water systems, and the like. In certain previously proposed apparatus for purifying water, galvanic action set up therein is utilized to assist in the purification of the water, but such action often becomes feeble and indeed sometimes ceases altogether owing it may be to the presence of dirt or other harmful matter within the apparatus.

Now, the chief objects of this invention are to promote or increase and ensure continuity of the galvanic action whereby the apparatus is rendered more efficient and its efficiency is continuously maintained.

The said objects are attained, according to this invention, by increasing the magnetisation or purifying or magnetic properties or electrical conductivity of the carbon or other filtering medium or of the filter, which is preferably done by connecting together metallic portions of the filter by means of a conductor composed of a different metal, preferably a copper strip, and additionally or alternatively by providing the apparatus with a steam jacket.

The said conductor ensures continuity of the galvanic action even under conditions which would render filters, as previously proposed, ineffective. The conductor, which is preferably made in strip form and arranged longitudinally or otherwise of the filter, may be bolted tightly to both ends or other portion of the filter-body and also to the perforated plates (when such are used) and is preferably partially or wholly embedded in the carbon or other filtering medium. Thus, where the filter-body, the perforated (or other) plates, the filtering medium, and the conducting strip are composed of iron, zinc, carbon and copper respectively, there is present a combination of materials in which galvanic action can be readily set up and continuously maintained. Even though the filtering medium may become non-conducting, the combination of iron zinc and copper will maintain the galvanic action. Other dissimilar metals than those referred to may, however, be employed in carrying out this invention.

The conducting strips, together with the plates or the like to which they are attached, form a framework which, when the said strips are detached from the filter-body, can be readily lifted out or otherwise removed from the latter, the guides between which the plates are usually fitted permitting this to be readily done.

The steam jacket may be supplied with live steam from the steam generator or the like, or by exhaust steam from an engine, or by steam from any other suitable source. The heat of the steam assists the de-oiling or de-greasing of the water and increases the efficiency of the filter. The steam jacket may

[Price 6d.]



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surround the sides and bottom of the apparatus and be provided with a steam-trap through which the condensed water passes to the pump suction, feed tank, or other point. In some cases, according to this invention, the steam may be caused to issue from the jacket through a small ejector and then passed into the feed before the latter enters the filter.

It is found that the higher the temperature the better are the results obtained, the decomposition of the water being then more complete or thorough, sulphates and carbonates are separated and rendered more susceptible to the action of zinc; chloride and carbonic gas are more freely thrown off and absorbed or rendered neutral. The carbon and zinc may become magnetic due to the action of heat and also to the friction set up by the flow of the hot feed.

It may be mentioned that by the provision of the said copper or like strips, the apparatus is as effective with cold water as an ordinary filter would be with hot water, and that by the further addition of the steam jacket the efficiency is still further increased. An additional advantage accruing from the adoption of this invention is that the electrical current or galvanic action is diffused throughout all parts of the steam generator or the like with which the water is in contact.

Also, according to this invention, the internal portion of the apparatus, that is, the filter portion, may be provided with a mud- or scum-pipe, preferably leading from a settling chamber at one end of the apparatus and passing through the steam jacket.

The apparatus is provided with an inlet valve, an outlet valve, and also, in accordance with this invention, with a bye-pass provided with a valve so that it can, when desired, be cut out for flushing or other purpose without interfering with the supply of feed-water to the steam generator or the like. When flushing out the apparatus, the said inlet valve is closed, and the mud- or scum-pipe and the bye-pass are opened, whereupon the feed-water is reversed in direction through the apparatus and emerges from the mud- or scum-pipe carrying with it the mud or scum. In this way economy of fuel is effected, because it is the feed water that is used for flushing instead of the water in the steam-generator or the like.

Apparatus constructed according to this invention may be fixed vertically, horizontally or at an inclination.

Dated this 3rd day of April, 1914.

H. T. P. GEE,  
Chartered Patent Agent,  
70, George Street, Croydon,  
Agent for the Applicant.

**COMPLETE SPECIFICATION.**

**Improvements relating to the Purification of Water, more particularly Feed-water for Steam Generators, Hot-water Systems and the like.**

I, CHARLES HAYTHORPE, of 7, Bowling Green Street, Kennington, London, S.E., Engineer, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the purification of water, more particularly feed-water for steam generators, hot water systems and the like. In certain

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previously proposed apparatus for purifying water galvanic action set up therein by contact of dissimilar metals is utilised to assist in the purification of the water, but such action often becomes feeble and indeed sometimes ceases altogether owing it may be to the presence of dirt or other harmful matter within the apparatus.

Now, the chief objects of this invention are to promote or increase and ensure continuity of the galvanic action whereby the apparatus is rendered more efficient and its efficiency is continuously maintained.

The said objects are attained, according to this invention, by increasing the magnetisation or purifying or magnetic properties or electrical conductivity of the carbon or other filtering medium or of the filter, which is preferably done by connecting together metallic portions of the filter by means of a conductor composed of a different metal, preferably a copper strip, and additionally by providing the apparatus with a steam jacket.

Further, according to this invention, the apparatus is fitted with a valved bye-pass so that it can be cut out for flushing or other purposes without interfering with the supply of feed water to the steam generator or the like.

The accompanying drawing represents, in part horizontal section and part plan, a filter embodying the improvements above referred to.

In the drawing, *a* represents the body of the filter, *b* the removable zinc plates, and *c* the carbon filtering medium, all these parts being as heretofore arranged. The filter is intended to be furnished with the usual cover (not shown).

*d, d* represent copper strip conductors arranged longitudinally of the filter and bolted in good metallic connection to the filter-body and perforated plates respectively by means of bolts *e, e*. The copper strips are preferably partially or wholly embedded in the carbon or other filter medium. Thus, where the filter-body is of iron, the perforated plates of zinc, the filtering medium of carbon and the conducting strips of copper, there is a combination of materials present in which galvanic action can be readily set up and continuously maintained.

Even though the filtering medium may become non-conducting, the combination of iron, zinc, and copper will maintain the galvanic action.

Other dissimilar metals than those referred to, and by the use of which galvanic action can be set up, may be employed in carrying out this invention.

The presence of the copper strips or the like ensures continuity of galvanic action even under conditions which, in their absence, would render filters ineffective.

The copper or the like strips may, if desired, be disposed otherwise than longitudinally of the filter.

The said conducting strips or the like and the zinc or other plates to which they are attached form a framework which, when the said strips are detached from the filter-body, can be readily withdrawn from the latter, the guides *a'*, *a'* between which the plates are loosely fitted permitting this to be easily done.

Referring now to the steam-jacket, shown at *f*, this may be supplied at *f'* with live steam from the steam generator or the like, or by exhaust steam from an engine, or by steam from any other suitable source. The jacket-outlet is shown at *f''*.

The steam-jacket may surround the sides and bottom of the apparatus and be provided with a steam-trap through which the condensed water passes to the pump suction, feed tank, or other point. In some cases, according to this invention, the steam may be caused to issue from the jacket through a small ejector and be then passed into the feed before the latter enters the filter.

The heat of the steam assists the de-oiling or de-greasing of the water and increases the efficiency of the filter.

It is found that the higher the temperature the better are the results obtained, the decomposition of the water then being more complete or thorough, sulphates

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and carbonates are separated and rendered more susceptible to the action of zinc, and chlorine and carbonic gas are more freely thrown off and absorbed or rendered neutral.

It may be mentioned that by the provision of the said copper or like strips, the apparatus is as effective with cold water as an ordinary filter would be with hot water, and that by the further addition of the steam-jacket, the efficiency is still further increased.

The distributing chamber of the filter is shown at  $a^2$  and the settling chamber at  $a^3$  while at  $a^4$  is shown the mud- or scum-outlet.

The filter is provided with the usual inlet and outlet valves  $a^5$  and  $a^6$  respectively, and also, in accordance with this invention, with a bye-pass  $a^7$  provided with a valve  $a^8$  so that it can, when desired, be cut out for flushing or other purposes without interfering with the supply of feed-water to the steam generator or the like. Normally, the inlet valve  $a^5$  and the outlet valve  $a^6$  are open while the scum-outlet  $a^4$  and the bye-pass valve  $a^8$  are closed, whereby the feed-water is compelled to follow the direction of the arrows and is filtered on its way to the steam generator or the like. When, however, it is desired to flush out the filter, the inlet-valve  $a^5$  is closed, and the mud- or scum-outlet  $a^4$  and the bye-pass valve  $a^8$  are opened, whereupon the feed-water is reversed in direction through the apparatus and emerges from the mud- or scum-pipe carrying with it the mud or scum. In this way economy of fuel is effected, because it is the feed-water that is used for flushing instead of the water in the steam generator or the like.

Apparatus constructed according to this invention may be fixed vertically, horizontally, or at an inclination.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In apparatus for the purification of water wherein the water is subjected to galvanic action, the provision of a copper or other suitable electrical conductor in good metallic connection with the body and with the perforated plates of the apparatus, substantially as described for the purpose of increasing and continuously maintaining the efficiency of the apparatus.
2. In apparatus for the purification of water, as claimed in Claim 1, the provision of a steam-jacket substantially as described for the purpose of still further increasing the efficiency of the apparatus.
3. In apparatus for the purification of water, as claimed in Claim 1, the bye-pass arrangement substantially as described for the purpose of enabling the flow of feed-water to be reversed through the filter for flushing or other purpose without interrupting the main flow of the water to the steam-generator or other point.
4. Apparatus for the purification of water having its parts constructed, arranged and adapted to operate substantially as described with reference to the drawing for the purposes specified.

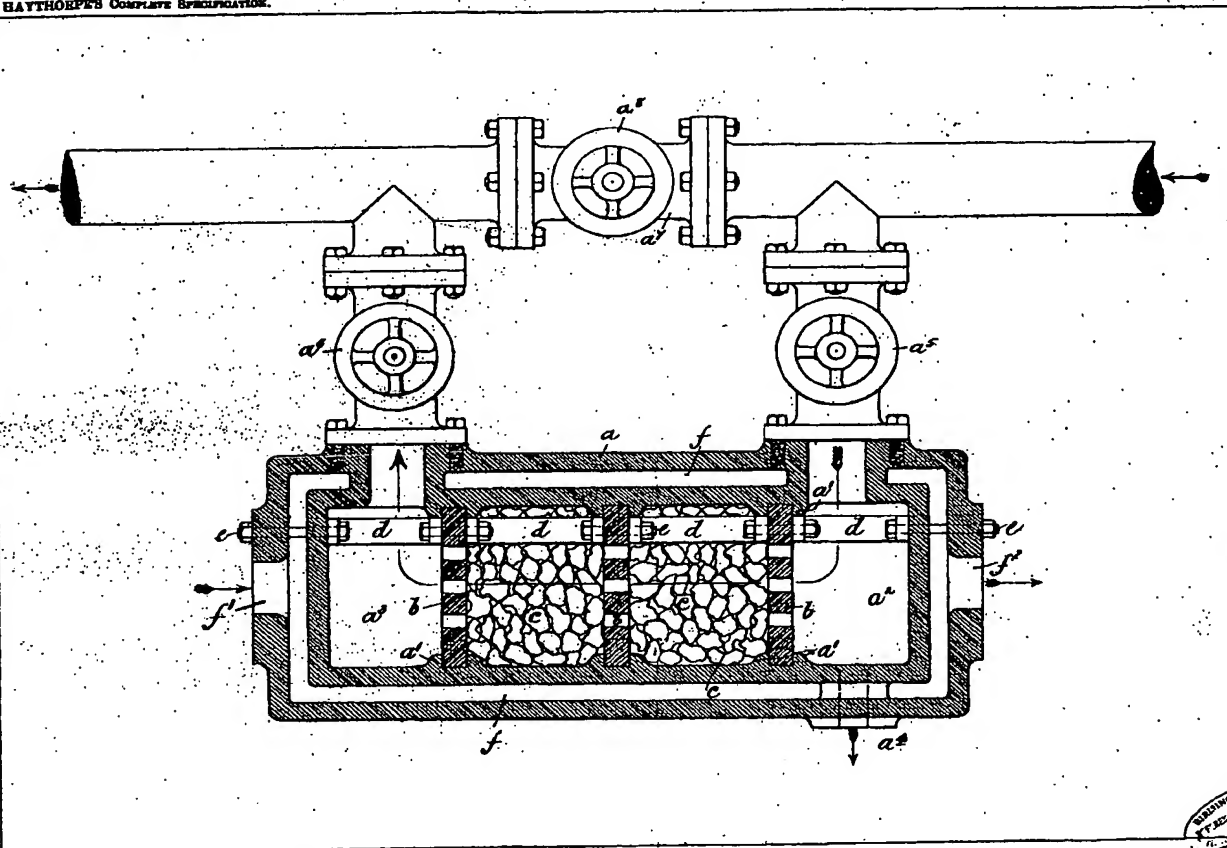
Dated this 16th day of October, 1914.

H. T. P. GEE,  
Chartered Patent Agent,  
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Agent for the Applicant.

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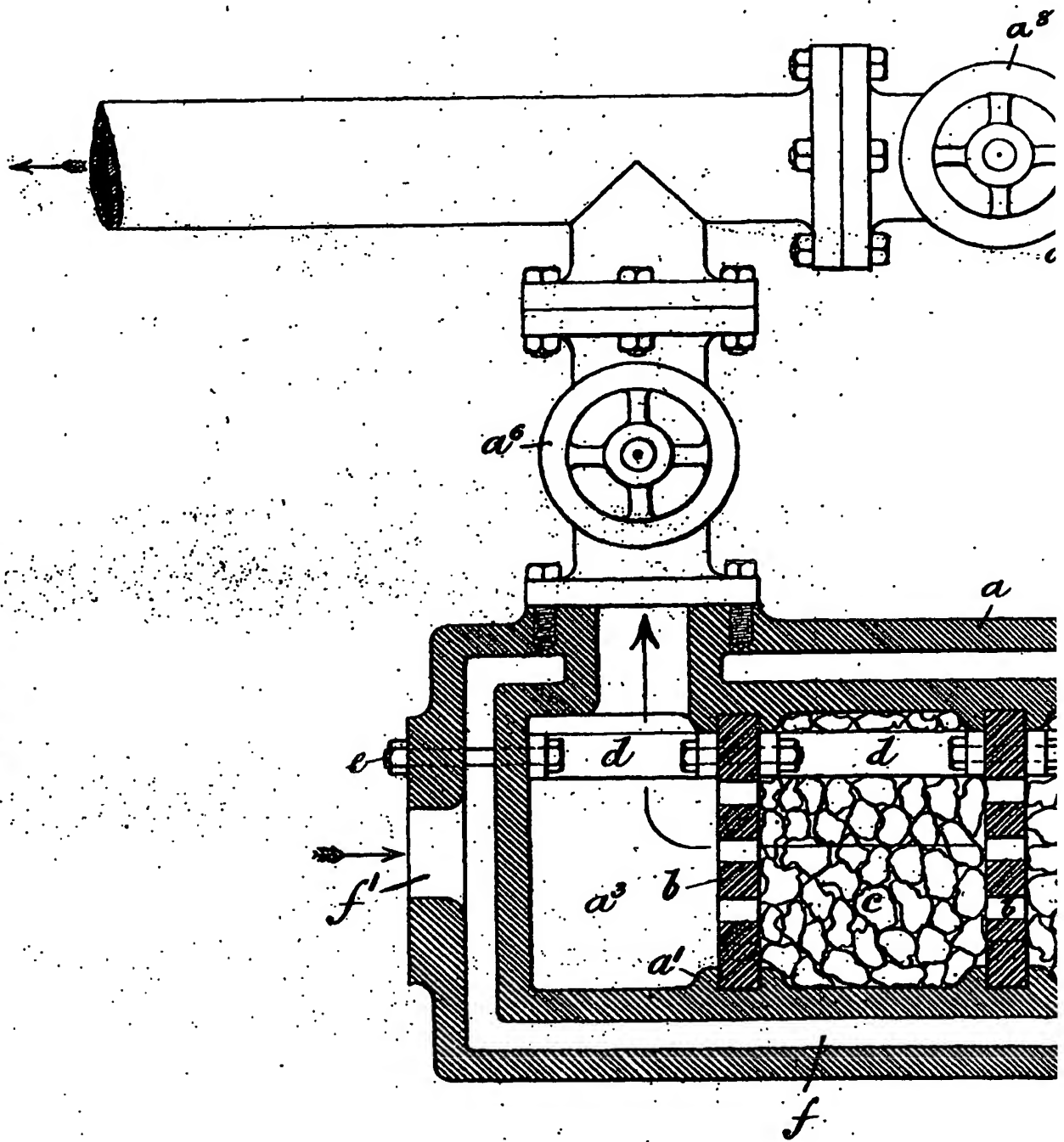
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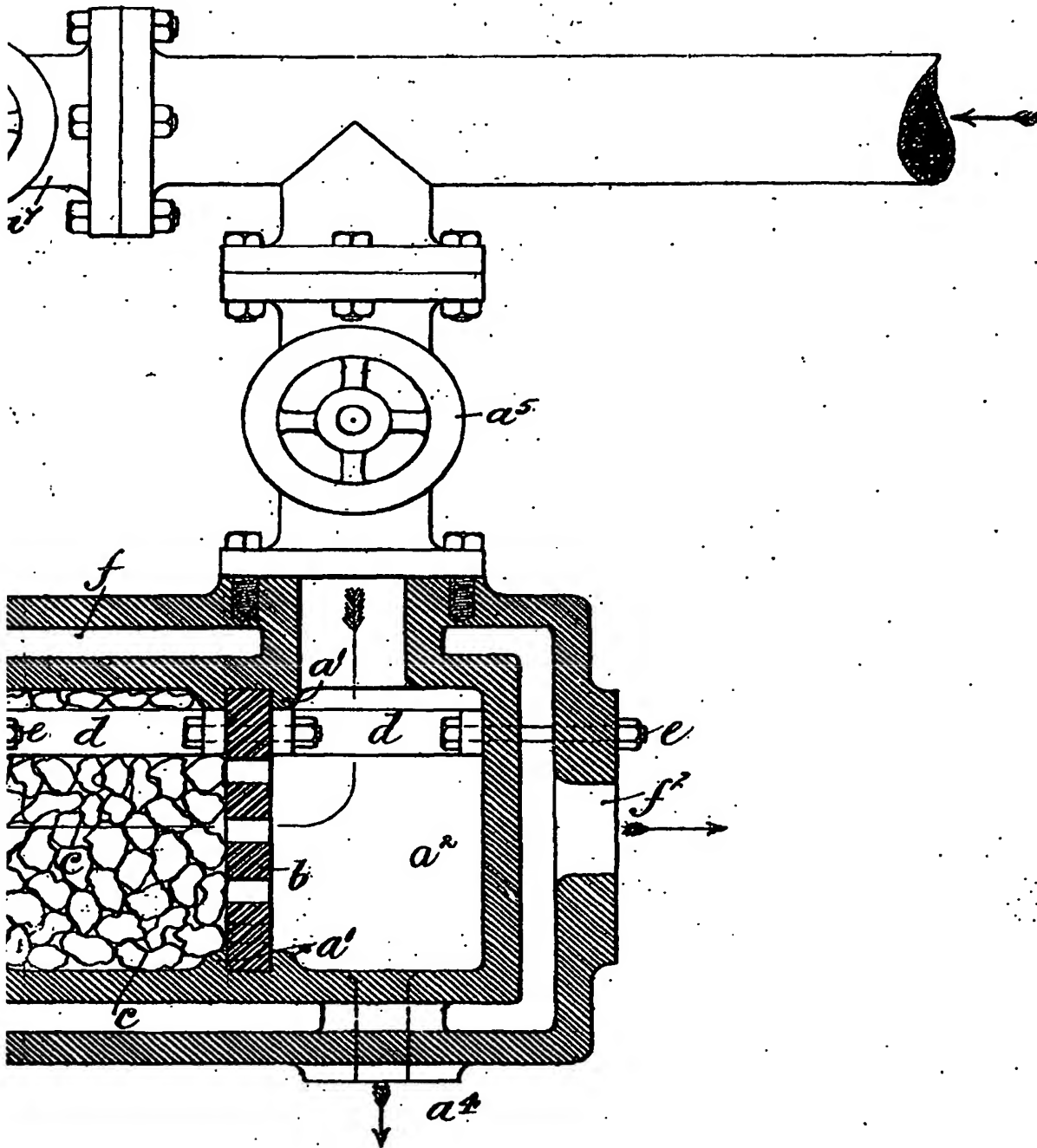
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HAYTHORPE'S COMPLETE SPECIFICATION.

[This Drawing is a reproduction of the Original on a reduced scale.]



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